

Claims

1. An optoelectronic component (1) comprising a semiconductor function region (2) with an active zone (400) and a lateral main direction of extension,  
characterized in that  
said semiconductor function region is provided with at least one opening (9, 27, 29) through said active zone, and disposed in the region of said opening is a connecting conductor material (8) that is electrically isolated from said active zone at least in a subregion of said opening.
2. An optoelectronic component (1) comprising a semiconductor function region (2) with an active zone (400) and a lateral main direction of extension,  
characterized in that  
said semiconductor function region is provided with a lateral side face (26) bounding said active zone, and disposed after said side face in the lateral direction is a connecting conductor material (8) that is electrically isolated from said active zone at least in a subregion of said side face.
3. The optoelectronic component as in claim 1 or 2,  
characterized in that  
said connecting conductor material (8) is at least partially electrically isolated from said active zone (400) by an isolation material (10).
4. The optoelectronic component as in one of the preceding claims,  
characterized in that  
said opening is configured as a depression (27) in the lateral direction or said side face (26) is provided with a depression in the lateral direction.
5. The optoelectronic component as in one of the preceding claims,  
characterized in that  
said isolation material (10) at least partially lines said opening (9, 27, 29) or is disposed at least partially on said side face (26).

6. The optoelectronic component as in one of the preceding claims,  
characterized in that  
said opening (9, 27, 29) extends in the vertical direction all the way through said semiconductor function region (2).
7. The optoelectronic component as in one of the preceding claims,  
characterized in that  
said semiconductor function region (2) comprises a first main face (6) and a second main face (13) located oppositely from said first main face relative to said active zone (400), and said semiconductor function region is connected electrically conductively to said connecting conductor material (8) on the side comprising said first main face.
8. The optoelectronic component as in claim 7,  
characterized in that  
said connecting conductor material (8) is electrically isolated from said second main face (13) of said semiconductor function region (2).
9. The optoelectronic component as in one of the preceding claims, characterized in that  
a lateral dimension of said opening (9, 27, 29) is equal to 100 µm, preferably 50 µm, or less.
10. The optoelectronic component as in one of the preceding claims,  
characterized in that  
an envelope (4) forms at least partially around said semiconductor function region (2).
11. The optoelectronic component as in claim 10,  
characterized in that  
said envelope (4) is transparent to a radiation to be generated or received by said active zone (400).
12. The optoelectronic component as in one of the preceding claims,  
characterized in that  
said active zone (400) is surrounded by an encapsulation (16) that is substantially hermetically tight.

13. The optoelectronic component as in one of the preceding claims,  
characterized in that  
said semiconductor function region (2) is disposed on a carrier (3).

14. The optoelectronic component as in claim 13,  
characterized in that  
said connecting conductor material (8) extends to a side of said carrier that is opposite said  
semiconductor function region.

15. The optoelectronic component as in one of the preceding claims,  
characterized in that  
said component (1) can be fabricated in the wafer composite (300, 200).

16. A device comprising a plurality of optoelectronic components as in one of the preceding claims,  
characterized in that  
said semiconductor function regions (2) are disposed at least partially side by side in the lateral direction.

17. The device as in claim 16, referring indirectly or directly to claim 10,  
characterized in that  
said envelope (4) is configured in one piece and at least partially forms around said semiconductor  
function regions.

18. The device as in claim 16 or 17,  
characterized in that  
said semiconductor function regions (2) are mechanically stabilized by a stabilization layer (4, 18).

19. The device as in claim 18,  
characterized in that  
said envelope (4) is configured as a stabilization layer (500) or part of said stabilization layer.

20. The device as in one of claims 16 to 19,  
characterized in that  
said device can be fabricated in the wafer composite.

21. A method for producing an optoelectronic component, characterized by the steps of
  - a) preparing a wafer composite comprising a semiconductor layer sequence (200) that is disposed on a carrier layer (300) and has an active zone (400) and a lateral main direction of extension;
  - b) structuring said semiconductor layer sequence such that at least one opening (9, 27, 29) through said active zone is produced or at least one lateral side face (26) bounding said active zone in the lateral direction is formed;
  - c) disposing a connecting conductor material (8) in the region of said opening or said side face such that said active zone is electrically isolated from said connecting conductor material at least in a subregion of said opening or of said side face;
  - d) singulation into optoelectronic components (1) whose electrical contacting is effected at least partially via said connecting conductor material.
22. The method as in claim 21, characterized in that said active zone (400) is electrically isolated from said connecting conductor material (8) via an isolation material (10).
23. The method as in claim 21 or 22, characterized in that said isolation material (10) is disposed in the region of said opening (9, 27, 29) or of said side face (26).
24. The method as in one of claims 21 to 23, characterized in that at least one depression (27) provided in said semiconductor layer sequence (200) in the lateral direction at least partially surrounds said opening or said opening is configured as a depression in said semiconductor layer sequence in the lateral direction.
25. The method as in one of claims 21 to 24, characterized in that a wall of said opening (9, 27, 29) is at least partially covered with said isolation material or said isolation material is at least partially disposed on said side face (26).

26. The method as in one of claims 21 to 25,  
characterized in that  
said opening (9, 27, 29) extends in the vertical direction all the way through said semiconductor layer sequence (200).
27. The method as in one of claims 21 to 26,  
characterized in that  
said opening is configured as a gap (9) in said semiconductor layer sequence (200).
28. The method as in one of the preceding claims,  
characterized in that  
said semiconductor layer sequence (200) is structured such that a plurality of semiconductor function regions (2) is produced.
29. The method as in claim 28,  
characterized in that  
said semiconductor function regions (2) are spatially separated from one another by interspaces (20).
30. The method as in claim 28 or 29,  
characterized in that  
a plurality of openings (9, 27, 29) through said active zone (400) is produced and a plurality of semiconductor function regions (2) comprises at least one opening through said active zone.
31. The method as in claim 28 to 30,  
characterized in that  
a plurality of semiconductor function regions (2) each comprise at least one depression (27) in the lateral direction that at least partially surrounds said opening, or, if a plurality of semiconductor function regions is present, the opening is configured as a depression in the lateral direction in the semiconductor function region concerned.
32. The method as in one of claims 28 to 31,  
characterized in that  
a plurality of said semiconductor function regions (2) each comprise at least one lateral side face (26) bounding the active zone (400) of the corresponding semiconductor function region.

33. The method as in claim 32,  
characterized in that  
said side face (26) bounds the corresponding semiconductor function region (2) in the lateral direction.

34. The method as in one of claims 28 to 33,  
characterized in that  
said side face (26) is disposed in the lateral direction after said connecting conductor material (8), which  
is electrically isolated from the active zone (400) of said semiconductor function region (2) at least in a  
subregion of the side face bounding the active zone of said semiconductor function region.

35. The method as in one of claims 21 to 34,  
characterized in that  
a first electrical contact (7) is applied to the side of said semiconductor layer sequence (200) facing away  
from said carrier layer (300), or to said semiconductor function regions (2).

36. The method as in claim 35,  
characterized in that  
said connecting conductor material (8) is disposed in the region of said opening (9, 27, 29) or of said side  
face (26) such that an electrically conductive connection is formed between said connecting conductor  
material and said first contact (7).

37. The method as in either of claims 35 or 36,  
characterized in that  
said opening (9, 27, 29) or said side face (26) is configured such that said first contact (7) can be  
connected electrically from the side of said semiconductor layer sequence (200) or of said semiconductor  
function region (2) located oppositely from that comprising said first contact.

38. The method as in one of claims 21 to 37,  
characterized in that  
a stabilization layer (4, 170, 500) is disposed after said semiconductor layer sequence (200) or said  
semiconductor function regions (2) on the side facing away from said carrier layer (300).

39. The method as in claim 38,  
characterized in that  
said stabilization layer (4, 170, 500) is applied to said semiconductor layer sequence (200) or said semiconductor function regions (2).
40. The method as in claim 38 or 39,  
characterized in that  
said stabilization layer (4, 170, 500) is disposed after said semiconductor layer sequence or said semiconductor function regions prior to the formation of said opening (9, 27, 29) or said side face (26).
41. The method as in one of claims 38 to 40,  
characterized in that  
said opening (9, 27, 29) or said side face (26) is formed in said semiconductor layer sequence or said semiconductor function regions (2) from the side opposite that comprising said stabilization layer (4, 170, 500).
42. The method as in one of claims 21 to 41,  
characterized in that  
said opening (9, 27, 29) or said side face (26) is formed in said semiconductor layer sequence (200) or said semiconductor function regions (2) from the side opposite that comprising said carrier layer.
43. The method as in one of claims 38, 39, 41 or 42,  
characterized in that  
said stabilization layer (4, 170, 500) is disposed after said semiconductor layer sequence (200) or said semiconductor function regions (2) after the creation of said opening (9, 27, 29) or of side face.
44. The method as in one of claims 38 to 43,  
characterized in that  
said stabilization layer (4, 170, 500) forms at least partially around said semiconductor function regions (2).
45. The method as in one of claims 38 to 44,  
characterized in that  
said stabilization layer (4, 170, 500) is self-supporting.

46. The method as in one of claims 38 to 45,  
characterized in that  
said stabilization layer (4, 170, 500) is transparent to a radiation that is to be generated or received by  
said active zone (400).
47. The method as in one of claims 38 to 46,  
characterized in that  
said stabilization layer (4, 170, 500) is provided at least in part by spin coating.
48. The method as in one of claims 38 to 47,  
characterized in that  
said stabilization layer (4, 170, 500) is provided at least in part by vapor deposition.
49. The method as in one of claims 38 to 48,  
characterized in that  
said stabilization layer (4, 170, 500) is disposed after said semiconductor layer sequence (200) or said  
semiconductor function regions (2) via an adhesion-promoting layer (4).
50. The method as in one of claims 38 to 49,  
characterized in that  
said stabilization layer (4, 170, 500) mechanically stabilizes said semiconductor layer sequence (200) or  
the structure comprising said semiconductor function regions (2).
51. The method as in one of claims 21 to 50,  
characterized in that  
said carrier layer (300) is at least partially thinned or removed.
52. The method as in claim 51,  
characterized in that  
following the thinning or removal of said carrier layer, said semiconductor layer sequence is structured  
into a plurality of semiconductor function regions.

53. The method as in one of claims 21 to 52,

characterized in that

said carrier layer (300) is structured according to the arrangement of said semiconductor function regions (2) in such fashion as to produce carrier layer regions that at least partially form a carrier (3) for said semiconductor function region (2) of said optoelectronic component (1).

54. The method as in one of claims 21 to 53,

characterized in that

said carrier layer is removed at least in a subregion and said opening or said side face is formed in said semiconductor layer sequence or said semiconductor function regions from the side facing away from said stabilization layer.

55. The method as in one of claims 21 to 54,

characterized in that

said optoelectronic component (1) is provided with an encapsulation (16) that substantially hermetically tightly surrounds said semiconductor function region (2).

56. The method as in one of claims 38 to 55,

characterized in that

said optoelectronic component is provided with an envelope (4) that at least partially envelops or forms around said semiconductor function region (2), and on singulation said envelope derives at least in part from said stabilization layer (4, 170, 500).

57. The method as in claims 55 and 56,

characterized in that

said encapsulation (16) comprises said envelope (4) and at least one additional encapsulating element (18).

58. The method as in one of claims 21 to 48,

characterized in that

said method is performed on wafer.